

## COLORADO

- |                    |                       |
|--------------------|-----------------------|
| 1. ligulata Cazier | 4. quadrivittata Horn |
| 2. lucia Fall      | 5. sparsa Horn        |
| 3. pulchella Hbst. | 6. variegata Lec.     |

## OREGON

- |                       |                             |
|-----------------------|-----------------------------|
| 1. angelica Fall      | 4. sinuata sexnotata Van D. |
| 2. connexa Lec.       | 5. variegata Lec.           |
| 3. plagiaticauda Horn |                             |

## FLORIDA

- |                       |                    |
|-----------------------|--------------------|
| 1. confusa Fisher     | 4. pulchella Hbst. |
| 2. *marginotata Chev. | 5. tubulus (Fabr.) |
| 3. ornata Fabr.       |                    |

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 THE GENUS ORTHOPODOMYIA THEOBALD IN CALIFORNIA

(Diptera, Culicidæ)

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While making observations and collections of *Aedes varipalpus* (Coq.), "the Pacific Coast tree-hole mosquito," in southern California during February, 1940, larvæ and adults of the genus *Orthopodomyia* were encountered. The larvæ were in tree holes of cottonwood, *Populus fremontii* Wats., which had been filled by rains. Previous to this time *A. varipalpus* had been the only culicid known to inhabit tree holes in California.

*Orthopodomyia* is a small genus of mosquitoes whose members breed exclusively in tree holes. Only two species are known to occur in the United States, *Orthopodomyia signifera* (Coq.) and *Orthopodomyia alba* Baker. The former was described by Coquillett (1896) from the District of Columbia. Its present distribution includes most of the eastern and southern states from Massachusetts to Texas. A previous but unrecognized record of this species in California was made by Clara Ludlow (1906), who reported "*Culex(?) signifera*" from Benicia Barracks, Solano County. Howard, Dyar, and Knab (1917) stated, however, "We quote the California locality cited by Dr. Ludlow

with doubt, as no other specimens have been received or reported from west of the Plains." As a result subsequent workers have chosen to ignore the record. The writer on March 21, 1940, visited Benicia Barracks and vicinity in an attempt to recover *O. signifera*, but the only tree-hole mosquito found breeding in this area was *A. varipalpus*. *Orthopodomyia alba* was described by Baker (1936) from Ithaca, New York. Since then it has also been recorded from Alabama, Shields and Miles (1937).

The immature stages of *Orthopodomyia* were first collected in California at Riverside, Riverside County, on February 17, 1940, a large cottonwood tree with two rot holes was found which contained larvæ of *Orthopodomyia* and *A. varipalpus*; those of the former were obtained in all four instars, and 150 adults were reared from this collection. A second collection was made on the same day three miles to the south of Riverside, from a cottonwood tree which also contained larvæ of both mosquitoes. Subsequent collections of *Orthopodomyia* were made on June 30 and July 12 from the same tree holes. At the latter date larvæ of all four instars, pupæ, and adults were found.<sup>1</sup> Another locality was discovered on July 2 when larvæ of *Orthopodomyia*, *A. varipalpus*, and *Culex quinquefasciatus* Say were collected in cottonwood and willow tree holes two miles to the west of Redlands, San Bernardino County. From this material 621 fourth instar larvæ and 145 adults have been examined.

Study of the larvæ has shown the Californian species to be *O. signifera*, although certain variations from characters given for the eastern *O. signifera* (see Baker, 1936) have appeared. According to King, Bradley and McNeel (1939) the principal character separating the larvæ of *O. signifera* from *O. alba* is the presence of dorsal plates on segments six, seven, and eight (occasionally seven and eight) as contrasted with no plates in *O. alba*. In the Californian specimens dorsal plates are not always present on abdominal segments six, seven, and eight. Of the fourth stage larvæ examined only 60 had plates on these segments, 368 had plates on segments seven and eight, and 243 had a plate on only the eighth segment. Of the latter group 59 later added a plate on the seventh segment, and three added plates on segments six and seven. Addition of plates takes place without

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<sup>1</sup> Breeding apparently occurs continuously in the tree where the original collection was made as on August 27 larvæ were still abundant, and adults were observed resting on the inner surface of the hole.

moulting and is apparently a hypodermal deposition the physiological nature of which is unknown. The number of teeth in the anterior row of the comb of the eighth abdominal segment varies from 13-22, as contrasted with previous descriptions of  $17\pm 2$  (*signifera*) and  $11\pm 2$  (*alba*). This variation and that recorded by Shields and Miles (1937) for *O. alba* of an increase to 18 would indicate that the character is of little value in differentiating *O. signifera* from *O. alba*.

The character of hypodermal pigmentation given as pink or purple for *O. signifera* and lacking for *O. alba* has been found in California to depend entirely upon larval diet. In sunny tree holes an abundant growth of *Thiocapsa*, a rose pink pigmented bacterium occurs. Larvæ from holes containing this pigmented organism have a purple or pink hypodermal coloration. Removal from such a hole and changing to a yeast diet results in loss of this pigmentation, and they become yellow to brown. These larvæ when placed in a container with the pigmented organisms become pink again within a week.

In other characters larvæ agree with those of typical *O. signifera*. General hairy appearance inconspicuous. Head capsule rounded, dark brown; antennal tuft inconspicuous, of three to five hairs; sub-basal tuft inconspicuous; transutural tuft single. Abdomen with lateral tufts of the first two abdominal segments short and multiple. Ventral tuft of sixth abdominal segment composed of seven to thirteen hairs. Siphon about three and one-half times as long as wide, slightly tapered; siphonal tuft with five to eight hairs. Anal segment completely ringed by its plate. Anal gills long and tapering.

Pupæ of the Californian *O. signifera* are brown with darker intersegmental bands. Those from larvæ with considerable pink pigmentation are especially dark. The respiratory trumpet is not so angular in outline as typical *O. signifera* because the sides are gently curved. However, in some cases the corners are sharp in outline.

Considerable difficulty has generally been experienced in separating the adults of *O. signifera* from *O. alba* (see Baker, 1936). The former has been described as having the cuticula of the first abdominal tergite purplish brown, a continuous apical black band on the second abdominal tergite, and abdominal

tergites from the third segment posteriorly with white basal triangular patches laterally. *O. alba* differs by having the cuticula of the first abdominal tergite yellow, triangular black apical areas laterally on the second abdominal tergite, and abdominal tergites from the third segment posteriorly with continuous white basal bands. The Californian specimens exhibit a marked trend towards *O. alba*. The cuticula of the first abdominal tergite is yellowish brown. In many specimens the second abdominal tergite is completely white scaled, but in the majority of cases there are dark, apical triangular areas laterally; the second abdominal tergite has a continuous apical black band in less than 20 per cent of the specimens. Abdominal tergites from the third segment posteriorly possess continuous white basal bands in 90 per cent of the specimens, and in only the remaining 10 per cent are basal triangular white patches found laterally.

Male terminalia agree with descriptions of *O. signifera*, except that the basal lobe has three to five large stout spines instead of only three; the majority have four as found in *O. alba*.

Adult specimens have been placed in the collections of the United States National Museum, the California Academy of Sciences, and the University of California. The writer is indebted to Dr. T. H. G. Aitken for verification of his determination and to both him and Prof. W. B. Herms for reading the manuscript.

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